MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Government Meteorologist, Kingston, Jamaica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen Collegel Havana, Cuba; Luis G. y Carbonell, Director, Meteorologica, Service of Cuba, Havana, Cuba; Rev. José Algué, S. J., Director of the Weather Bureau, Manila Central Observatory, Philippines; Maj. Gen. M. A. Rykachef, Director of the Physical Central Observatory, St. Petersburg, Russia; Carl Ryder, Director, Danish Meteorological Institute, Copenhagen, Denmark.

As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

The month opened with abnormally high barometric pressure over the British Isles and Iceland. The barometer was also above the normal over the Hawaiian Islands and northern portions of the United States. Attending this unusual distribution of atmospheric pressure, temperature was below the seasonal average generally over the interior of the United States and was above normal in the Plateau and Pacific States and on the Atlantic coast.

The first well-defined disturbance traversed the country from the 1st to 7th, preceded by temperature rising above the seasonal average, attended by local rains, and followed by a brief period of fair weather and moderate temperature. The following special forecasts regarding this warm period were issued:

THURSDAY, *July 2, 1908.*

The warm wave that now covers the extreme Western States will advance over the Plains States by Saturday, overspread the central valleys Sunday and Monday, and set in over the Atlantic States Monday and Tuesday.

SUNDAY, *July 5, 1908.*

A barometric depression that extends from Minnesota to Texas will drift slowly eastward during the next three days and cross the Atlantic seaboard about the middle of the week, preceded by warm, fair weather, attended by local rains, and followed by cooler, fair weather. The cooler area will reach the upper Mississippi Valley and the western Lake region Monday, will cover the Ohio Valley and eastern Lake region Tuesday, and reach the Atlantic coast Tuesday night or Wednesday.

The depression crost the Atlantic seaboard Wednesday, attended by local rains, and the cooler area advanced as indicated, overspreading the Atlantic coast States during Tuesday night and Wednesday. The passage of the depression was followed in the several districts by three days of cooler, fair weather.

On Thursday, July 9, the following special forecast was issued:

THURSDAY, *July 9, 1908.*

A warm wave that will cover the Plains States Friday will extend over the central valleys Saturday and set in over the Atlantic States Sunday. The warm period will be of two to three days duration in the several sections, and will end with rains in the Plains States on Sunday, in the Mississippi Valley and western Lake region Monday, and in the Ohio Valley, the eastern Lake region, and the Atlantic States Monday or Tuesday. The rains referred to promise to be sufficiently heavy to end the existing serious drought in the Ohio Valley and Middle Atlantic States.

The warm wave was the most intense of the present summer. Its progress and duration, and the movement of the rain and cooler area conformed to the forecast. In the Middle Atlantic States the warm wave set in Sunday and continued until Tuesday when it was broken by rains that were heavy in areas from the Ohio Valley over the Middle Atlantic and southern New England States.

On Wednesday, July 15, the following special forecast was issued:

WEDNESDAY, *July 15, 1908.*

A barometric depression that now covers the Rocky Mountain districts will move over the Plains States Thursday, cross the central valleys and Lake region Friday and Saturday, and reach the Atlantic States Saturday night or Sunday, preceded by rising temperature, attended by local rains and thunderstorms, and followed by two or three days of fair and cooler weather. This depression will cause rains in the wheat and corn belt and also rather copious rains in the Ohio Valley and the Middle Atlantic and New England States.

The depression advanced as forecast and generous rains fell in the corn and wheat region. Rainfalls were also heavy in areas in the Ohio Valley and in the Atlantic States north of Maryland and relieved the drought that prevailed in those sections. The depression was followed, in the interior of the country, by two or three days of temperature below the seasonal average. In the Middle Atlantic States the fall in temperature was slight.

The following forecast was issued on July 21:

TUESDAY, *July 21, 1908.*

Showers will set in over the Rocky Mountain regions Wednesday, and the rain area will advance over the Plains States Thursday, the central valleys Friday and Saturday, and reach the Atlantic States Sunday or Monday. Preceding the rain area temperature will rise in the several districts, and following its passage will come a period of cooler weather that will cross the country the latter half of the week and reach the Atlantic coast about the beginning of next week.

This forecast was verified as regards the eastward movement of rain and temperature areas. However, an extensive area of high barometer building up over the Atlantic Ocean from the 16th to 23d was joined on the 20th by a high area that had advanced over the Northern States and Canada, and combined with low pressure over the interior of the country to cause a drift of easterly winds from the Atlantic over the eastern portion of the United States. This resulted in several days of unsettled showery weather that began on the 21st and continued until the 27th.

In the meantime a shallow barometric depression advanced from the Caribbean Sea to the Gulf of Mexico from the 21st to 23d. Pressure continued low over the Gulf until the 25th when two centers of disturbance began to form, one over the west Gulf and the other near the east Florida coast. The west Gulf depression drifted slowly northward over the coast line without developing marked intensity. The disturbance near the Florida coast gradually deepened until the 29th, when a northward movement began and on the morning of the 30th a storm of marked intensity was central off the North Carolina coast. During the 30th the depression deepened rapidly and at 4:20 p. m. a reading of 29.18 inches was reported at Wilmington, N. C., and at the regular evening report of that date a reading of 29.22 inches was reported at that station. Storm advices had been sent to Atlantic ports for several days and storm warnings were displayed on the 30th from Wilmington, N. C., to Cape Cod. Based upon the 4:20 p. m. special report hurricane warnings were ordered from Hatteras to Norfolk. During the 31st the center of disturbance moved slowly northward and at the evening report had passed north of Hatteras where the barometer at the time of the regular evening observation read 29.32 inches. The subsequent course of this storm was northeast near the Middle Atlantic and New England coasts, and it disappeared over Newfoundland the night of August 2.

Concurrent with the passage of this storm along the Atlantic coast of the United States a destructive typhoon visited the China coast in the neighborhood of Hongkong and Canton.

The Jacksonville, Fla., Evening Metropolis, of July 30, 1908, comments as follows regarding this storm:

> The storm that the Weather Bureau has been watching for three or four days has at last shown itself, and this morning is approaching the coast line near Wilmington, N. C. At 7 a. m. the wind velocity at North Carolina stations was between 40 and 50 miles an hour from the east and northeast. No doubt the disturbance has given some sailing vessels a hard time. The fact that the storm has at no time been near land, and yet located daily with almost absolute accuracy, shows the exactness with which the Weather Bureau makes its predictions. There are a number of vessels that delayed sailing on account of the display of storm warnings, and they now appreciate the wisdom of their conduct. The Weather Bureau was established to render service. Who will say it is not doing so?

The month closed with moderate temperature from the central valleys over the Atlantic coast States, and exceptionally high temperatures in the northern Rocky Mountain districts, where maximum readings ranged above 100°.

BOSTON FORECAST DISTRICT.*
[New England.]

The drought that prevailed thru June continued during the first two weeks of July. During the latter half of July well-distributed showers occurred. Temperature ranged high, and in a number of instances maximum temperatures were the highest recorded in a number of years. Storm warnings were displayed on the 17th and 30th, and there were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*
[Louisiana, Texas, Oklahoma, and Arkansas.]

Temperature was about or below normal and precipitation was unevenly distributed. But one storm, that of the 30th, appeared on the Gulf coast. Warnings that were justified were ordered for the Louisiana and Mississippi coasts on the morning of that date.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*
[Kentucky and Tennessee.]

Temperature averaged near the normal and precipitation was generally below the seasonal average. The longest warm period was from the 12th to 17th, and the longest cool period from the 8th to 11th. There were many thunderstorms, some of which caused local damage, and in Kentucky alone there were 10 or 12 casualties from lightning.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*
[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

No warnings were issued and none was required. Temperature was below normal during the first portion of the month, but a warm wave began during the third decade and the period closed with temperature abnormally high. Rainfall as a whole was deficient.—*H. B. Hersey, Inspector and District Forecaster.*

DENVER FORECAST DISTRICT.*
[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

Heavy rainfall over an area extending from the Gulf of California to western Nebraska was a feature of the month. In northern portions of Utah and Wyoming the month was unusually dry. Temperature was below normal east and generally above normal west of the Continental Divide.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†
[California and Nevada.]

Except at the close of the month when temperatures exceeded 110° in the interior of the State the month as a whole was cool in California. There were many thunderstorms in the mountains. Light showers fell at the beginning of the second decade and from the 10th to 14th showers occurred in Nevada and the Sierra. There were no storm nor frost warnings issued.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†
[Oregon, Washington, and Idaho.]

The month was quiet with temperature above and rainfall generally below normal. Periods of high temperature extended from the 6th to 12th, 18th to 22d, and 29th to 31st, the last-named date showing very high temperatures over the eastern portion of the district. No special warnings were issued and none was needed.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The lower Mississippi River floods of the spring and early summer of the year 1908 were especially remarkable for their extreme duration. They may be said to have begun when the Ohio River flood of February reached New Madrid, Mo., on the 21st of that month. From this time until July 24 either the entire lower river, or some portion thereof, was above the flood stage. The flood stage of 16 feet was first past at New Orleans on March 9, and the river did not again fall to that stage until July 25, a period of 138 days. The following table shows the number of days the lower Mississippi River was at or above flood stage from New Madrid to New Orleans. Comparative figures for the great flood of 1903 are also shown.

These lower Mississippi floods were also remarkable for the fact that for the first time in more than a generation the western tributaries played an important part. As a rule, unless the Ohio River is very active, the floods below Cairo, Ill., are neither prolonged nor dangerous, but during the present year, with the Ohio only moderately active, the floods were of unprecedented duration, altho not so great in volume as those

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.